

When Video Meets Health: Vaccine Awareness for Millennials

The Honors Program
Senior Capstone Project
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ABSTRACT

The unique intersection of communication/video and science/health will be demonstrated through this honors project. The goal of the vaccine video is to inform Millennials about how vaccines work and the significance of vaccines to the community. The storyboard for a video was especially designed to communicate this information to those not in the science field, as well as those who are vaccine hesitant. The extensive process of information gathering required for the pre-production of the vaccine video will be discussed in depth – including the secondary research from the literature and the results from the formative survey and focus group research. This honors project is a creative educational campaign designed to promote proactive decision making about vaccines.

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INTRODUCTION

I grew up hearing many stories from my grandmother about her life. However as I began taking the class, “Immunity & Disease” in college, one particular story stood out from the rest - taking her children out of Rhode Island to escape from polio. My grandfather was a police officer at the time and after working all day at the police station, he came home and told my grandmother, ‘pack up the suitcases, get the children packed, we’re going to Pennsylvania’. He had heard that my grandmother’s cousin’s little boy had just died from polio. My grandfather felt there was too much polio going around the state, so he drove all night and all day - 17 hours - to bring his children to his parent’s house in Pennsylvania where they stayed all summer until the outbreak had dissipated. Since hearing this story, vaccination was always important to me personally. However, I understand not everyone has these stories in their family. By reading the literature, analyzing a survey, conducting a focus group, and going through a creative process, I was ultimately able to decide what content would be best to include in a storyboard of a video for millennials about vaccines.

LITERATURE REVIEW

Millennials & Vaccines

As of 2014, the majority of Americans, 83%, view childhood vaccines as safe according to the Pew Research Center (Anderson, 2015). However, those that believe vaccines are harmful are more likely to be young adults versus an older demographic with 12% believing they are unsafe compared to 5% respectively (Anderson, 2015). Caffrey’s (2016) findings support this, seeing as though 52% of those aged 18 to 34 years old do not plan to have a flu shot in the 2016-2017 flu season compared to 42% of all US adults. This is the age range of Millennials. The reasons cited in the survey from the Caffrey 2016 article for not getting a flu shot were that 49% said they don’t trust the shot to prevent them from getting sick, 29% said they thought it would make them sick, 25% don’t want to spend the money, 23% don’t think they need because they’ve never had the flu, and 4% don’t know where to get a flu shot. It is not only vaccination choices for themselves that Millennials have opinions about. When asked whether parents should have the choice to vaccinate their children when compared to making

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vaccinations mandatory, 41% of Millennials (18 to 29 years old) supported parental choice in comparison to the 20% of ages 65 and older who believe in parental choice (Anderson, 2015).

Vaccine Hesitancy

Vaccine hesitancy lives on a continuum from complete support of vaccines (called active demand) to complete refusal on the opposite end of the spectrum (Dube, et. al., 2013).

However, the official definition of vaccine hesitancy from the World Health Organization is “a delay in acceptance or refusal of vaccination despite availability” (Dube, et. al., 2013). It is vaccine hesitant attitudes that are believed to contribute towards declining vaccine coverage, which in turn increases the risk of vaccine-preventable diseases and outbreaks (Dube, et. al. 2013). Reasons for vaccine hesitancy can vary because the decision of whether to get vaccinated does not live in a vacuum - it is part of the larger social world (Dube, et. al., 2013). The different factors that could contribute are past experiences with health services, family histories, feelings of control, conversations with friends, etc. (Dube, et. al., 2013).

What Has Been Done (previous campaigns and the current video landscape)

Between September of 2011 and January of 2012, Shropshire’s research team created a mass media campaign at a large southern university to encourage university students to obtain the influenza vaccine (Shropshire, Brent-Hotchkiss, & Andrews, 2013). The dates, times, and locations of availability for getting the vaccines were consistent from the previous year so that vaccine uptake rates were resulting from the campaign. (Shropshire et al., 2013). For the campaign, the information was consistent but was disseminated through various media channels including a Powerpoint presentation (on the televisions in common areas on campus and 120 faculty agreed to display it prior to class during the campaign timeframe), flyers, internet (student health center website), banner advertisements (campus homepage and portal), and social media (a facebook event). (Shropshire et al., 2013). A total of 889 students received the vaccine in the Fall 2011 semester, which was nearly a 30% increase from the prior year when only flyers were used. (Shropshire et al., 2013). Out of these vaccinated students, 721 agreed to participate in a survey. It was found that aspects of the mass media campaign reached over 70% of surveyed students. (Shropshire et al., 2013). This campaign is a successful example of sending vaccine information to millennials.

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However when looking at what has been done before, it is important for this project to also see what exists on YouTube as far as the video landscape concerning vaccines. A content analysis was conducted by Briones' research team at the University of Maryland which analyzed 172 YouTube videos relating to the human papillomavirus (HPV) vaccine (Briones, Nan, Madden, and Waks, 2012). They found that the overall tone of the videos was negative - with the majority 51.7% (89 videos) disapproving of the HPV vaccine (Briones et al., 2012). The majority of videos sources were from news sources at 36.1% (62 videos) and the second largest category was from consumer-generated content at 12.8% (22 videos), which consists of people talking about their personal opinions (Briones et al., 2012). However no significant results could be concluded as to a connection between the video source and the video tone (Briones et al., 2012). This content analysis is important because it calls for health organizations/agencies to publish high-quality, credible videos to counteract the negative trend, as only 9.3% (16 videos) were produced by medical centers/hospitals and 8.1% (14 videos) developed by nonprofit or academic organizations (Briones et al., 2012). This content analysis also concluded that YouTube does have the potential to change attitudes, as most videos were positive a few years prior to this content analysis which was conducted in 2012 (Briones et al., 2012). It is suggested that these videos be watched so health communicators can better understand the public discourse when creating educational materials (Briones et al., 2012).

Why Video?

Video is just one of the many mediums that can be used to convey health information. Beaujean et al. (2016) compared the effectiveness and appreciation of a leaflet vs a movie in preventing tick bites and Lyme disease; while this is not exactly about vaccine hesitancy, there is a similarity of the focus on prevention and protective behaviors. For example, teaching people to wear protective clothing and avoid tick areas to prevent Lyme disease is a preventative call to action for Lyme disease, just as getting a vaccine is a preventative call to action for many diseases. The study used over one thousand participants split into four groups - two intervention groups (one for the movie and one for the leaflet) and two control groups (Beaujean et al., 2016). There was a baseline questionnaire, a knowledge questionnaire given

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to the participants after viewing either the movie or the leaflet interventions, which included questions such as “Imagine you have removed a tick. How long after the bite should you monitor your health?” and true or false questions such as “Lyme disease usually starts with a red circle on the skin” (Beaujean et al., 2016). Then, a final questionnaire was given after 1 month (Beaujean et al., 2016). Knowledge scores in both the intervention groups were higher than in the control groups to a significant degree (Beaujean et al., 2016). However, the group who viewed the movie had significantly better knowledge sum scores at both the measurement times than compared to the leaflet group (Beaujean et al., 2016). This shows that even though either method of teaching is effective, the video-based intervention group was more effective when it came to gaining knowledge. However, the audience would have appreciated a shorter video, since the only difference in measure of appreciation of the methods was that the respondents liked that the leaflet was quicker than the 5 minute video (Beaujean et al., 2016). Knowing this provides support for a shorter video in the current vaccine project.

Krawczyk et al. (2012) employed a similar idea of video compared to pamphlets, but specifically targeted the HPV vaccine. A video and a pamphlet were created using identical information and distributed to 200 college students split into a written group, a video group, and control groups (Krawczyk et al., 2012). Both a sum of knowledge score and a measure of vaccine intention were taken before and after the intervention of either the written, video, or control condition which took five minutes (Krawczyk et al., 2012). A sum of knowledge score was taken using questions about cervical cancer, HPV and the HPV vaccine including the following questions: true or false “HPV is the main cause of cervical cancer”; “HPV is sexually transmitted;” and “The HPV vaccine helps prevent the contraction of genital warts” (Krawczyk et al., 2012). Vaccine intention was measured with a Likert scale for the question, “Do you intend to receive the HPV vaccine” (Krawczyk et al., 2012)?

The results were similar to that of the Lyme disease study where both the written and video intervention increased the knowledge scores of the participants significantly in comparison to the control group. However, no significant differences existed between the video and pamphlet groups (Krawczyk et al., 2012). As far as vaccine intentions, similar results

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occurred, with an increase from the written and video groups compared to the control group, but no significant difference between the two methods (Krawczyk et al., 2012). Even though it did not show that video was better or worse than written material in this case, it showed that video was still an effective form of knowledge distribution and increasing vaccine intentions. One possible reason for this result was that the video was only of a health professional talking and did not have any music, special graphics and other elements that many other videos contain (Krawczyk et al., 2012). This study is important because it used college students as the population. The authors suggest the continued creation of both written and video interventions, with consideration of the target audience's age, gender, and culture (Krawczyk et al., 2012). These considerations informed the storyboard creation process of the current project.

FORMATIVE RESEARCH

Survey

An IRB-approved study called *Attitudes, Beliefs and Knowledge of Vaccines: Exploring Vaccine Hesitancy among Young Adults* was conducted by Julie E. Volkman, PhD; Kirsten L. Hokeness, PhD; Alyce Viens, MA; & Alexandra Dickie during the Fall 2016 semester. The study was advertised at Bryant University and Nichols College. Out of 255 total participants, the data was filtered to analyze the responses of Millennials, 180 of the participants. These participants were mostly female (n = 114; 63.3%), have some college experience (n = 131; 72.8%), are business majors (n = 104; 57.8%) and self-reported being White/Caucasian (n = 123; 68.3%). Questions were taken from the World Health Organization (WHO) Vaccine Hesitancy items and additional questions were written by the researchers. A series of Likert scales (1=Strongly Disagree to 5=Strongly Agree) were used and SPSS statistics were run to find the mean and standard deviation. Some open-ended questions were included in the survey as well, which were coded for by the researchers. The full results from the study were submitted to the *Journal of Health Communication*. Below are a summary of the results most useful for the development of this video project and are inserted as Appendix A.

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To assess the target population's receptivity to additional vaccine information, the survey included a 5-point Likert scale prompt: "I want to know more than I currently know about vaccinations." There would be no purpose in making a video about a topic that no one is interested in, however, this question revealed a 3.56 mean (st. dev. 0.87) indicating that participants "agree" with the statement. The results from this question, that Millennials want to learn more about vaccines, is important because it shows that a video teaching about vaccines could have an interested audience among this generation.

One of the topics when thinking about creating a video about vaccines is the autism myth. Andrew Wakefield was a researcher responsible and was guilty of deliberate fraud for falsifying facts in his 1998 study linking the MMR vaccine with autism (Sathyanarayana Rao & Andrade, 2011). Both autism and the MMR vaccine occur in early childhood, which is partly why there seemed to be initial support for the link (Sathyanarayana Rao & Andrade, 2011). A statement regarding autism given on the survey (along a Likert scale) to see if this myth persisted in the target audience was "I believe vaccines cause severe side effects such as autism". The results had a mean of 2.13 (st. dev. = 1.03), which indicates that the answer is towards the disagree side. As a result, the autism debate does not need to be explained in detail as predicted before the start of this project. It can be mentioned in the overall vaccine video, but does not demand a focus, since this result shows that most Millennials already do not believe there is a link between autism and vaccines.

One of the survey items that yielded interesting results was the statement "I believe I can get the disease I am vaccinating against from the vaccine itself". This resulted in a 2.77 mean which is towards the disagree side. However its standard deviation of 1.13 was among the highest of the entire survey. When subtracted from the mean, it is still on the disagree side. However, when added to the mean, it crosses over into the agree side and not just by a few hundredths of a point either. $2.77 + 1.13 = 3.90$. This means that it could fall on the agree side which is different than most of the other statements, which even when adjusting for standard deviation still stayed within the same answer side. As far as video creation, this result showed that discussing about how vaccines work and how they are formed could be beneficial to

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clarify for Millennials because the results hovered towards the neutral zone closer than we would like.

From the Likert-scale measures, Millennials in the survey seemed to be pro-vaccine, agreeing that “Vaccines are safe” ($M=3.63$, $S=.95$). However the open-ended questions brought up some other things to consider. There was a confusion between shots and vaccines. Not all shots are vaccines, so this could be quickly clarified within a general video about vaccines. The open-ended questions also asked participants to name vaccines. In the results, it was surprising to find that some of the ‘vaccines’ that were listed do not actually exist - for example an HIV vaccine. This shows that there could still be more education about vaccines in general. When asked to list what vaccines are important for personal health and then what vaccines are important for the community, the answers differed, implying that there is a misunderstanding about what herd immunity is. Volkman, Hokeness, Viens, & Dickie (2017) suggest, “More communication efforts are thus needed to help young adults to understand how vaccination works and the importance of individuals getting vaccines to help themselves and the larger community”. The video for this project can focus on how vaccination works, which is the first step. Another future video in a series could describe the larger community.

Focus Group

An IRB-approved focus group was conducted on December 1, 2016 at Bryant University. Potential participants were college students from Bryant University who were notified through Professor Volkman’s Introduction to Health Communication class. This class has the potential to encompass majors other than only Communication, since there are no prerequisites and can be taken by students of various grade levels. Even though the focus group was occurring during what would have been class time, it was made known that participation in the focus group about vaccines was completely voluntary and did not impact students’ grades for the class in any way. A \$25 Visa gift card would be raffled off to those who chose to participate. Three students chose to attend. They were each given a consent form explaining that they had the right to leave at any time, their answering of any questions was completely voluntary, and ensuring anonymity in reporting results.

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Once signed for consent and after a quick warm-up activity, the participants were each given a post-it note for their first activity. A continuum was drawn on the board from anti-vaccine on one side to pro-vaccine on the other. One participant placed their sticky note at anti-vaccine, one placed their sticky note at pro-vaccine, and one placed their sticky note directly in the middle of the two sides.

The entire focus group transcript (taken from the recording) is attached as Appendix B and is coded for voices 1, 2 and 3 instead of participant names with highlighted parts that were interesting to the interviewer. Questions were asked about vaccine hesitancy and then two short videos were shown. It was discussed that some of the information would help decide what to put in a video or video series about vaccines. It confirmed that a series of short videos would be better than one long video and could start with a general video and then go into more specific topics.

From the questions about vaccine hesitancy, some overall themes could be concluded. The role of doctors and parents in making a decision was important to the participants, which shows college students do not make these medical decisions alone. The group was asked if there was any education regarding vaccines or research in their prior schooling experiences and it was concluded that there was “not a lot of education for that”, “just get your flu shot every year.” This makes the creation of a video series all the more important.

Since the survey showed that there was a confusion between shots and vaccines, the question of “Are shots and vaccines the same thing?” was discussed in the focus group. Voice 1 said “I know there are certain shots that don’t have to be vaccines,” but admitted that “I couldn’t tell you the difference in what they do.” Voice 2 said similarly that a shot of morphine for example “it’s not really preventing like anything” whereas something like the flu shot “prevents you from getting sick later.” It was suggested by Voice 3 that the confusion could come from childhood, “I think the issue is when you are talking to kids and they think of a shot as being the vaccine and they don’t know obviously what a vaccine is...when they grow up, they don’t really know what the difference is....I know a couple of people who don’t

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know the difference between immunization, vaccine or a shot.” This shows that even the basics of what constitutes a vaccine is important to address in a video.

The Honors Council felt that fear of needles could be a potential barrier to vaccines, contributing to the hesitancy to get vaccinated. Since this topic was not addressed in the survey, it was asked of the focus group when discussing barriers, “one of the things that the Honors Council actually brought up this idea of fear of needles. Is that an issue for you?” Voice 1 said, “I know a lot of people who do (have a fear of needles) and that’s their sole reason for not getting the vaccination,” although Voice 1 admitted that it “all depends on how much they fear it (needles).” In regards to the friend Voice 1 was referring to, “if it really came down to it I’m sure he would get the shot if he really needed to, but there’s other people that just won’t do it. It’s hard.” This information suggests that fear of needles lives on a continuum and suggests that those with large amounts of fear cannot be helped. However this conversation also implies that even if this issue is not addressed directly in a video, showing the importance/perceived benefits of vaccines in general may help convince some who have lower levels of fear of needles.

The first video (<https://youtu.be/Ffhi1CPzT48>) shown to the focus group was of Penn & Teller demonstrating a visual exercise. They used a visual display of bowling pins on each side of the room and then placed a glass wall in front of most of one side to represent vaccination. Each of them had a bucket of balls that were labeled with different diseases. Penn & Teller called out the names of the diseases, such as diptheria and polio as they began to each throw them at their respective sides of bowling pins. The side with the plexiglass ‘vaccination’ had barely any pins knocked over while the other side had many knocked over.

Since the first video called out names of many illnesses, it was brought up whether participants knew what these illnesses were, which they admitted they did not. Then it was asked whether it would make a difference to explain those diseases more, but the participants concluded that just naming them was enough, Voice 2 said “it was like the unknowing of like...what are those diseases? I don’t even know what they are? I don’t even know like what

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they could do to me. So it was kind of more effective for me to think that like ‘Oh the vaccine blocked all those, thank god. I wonder they would do to me.’ ” Even Voice 1 admitted that “you could also be thinking about like the actual illness, you forget about that.” This conversation shows that making a video about the specific dangers of each disease would not be of much help as an approach to reduce vaccine hesitancy.

The second video (<https://youtu.be/ztiHRiFXtoc>) shown to the focus group was in a whiteboard drawing style - an AsapSCIENCE video. AsapSCIENCE is a YouTube channel created by Canadian youtubers Mitchell Moffit and Gregory Brown. The channel produces weekly videos that touch on many different topics of science. (can you explain what is ASAP science video). The particular video shown is the focus group was about exercise vs. diet when it comes to weight loss, but the focus group was told to pay attention to the format of it if we were to apply that style to a video about vaccines. The discussion then turned into comparing the two different formats - live action or drawn. Voice 1 said “I wouldn’t say they (the videos) are better than each other,” but admitted that the drawing one is “more geared towards the visual learner.”

It is the visualization that was emphasized by the focus group - especially when it comes to statistics. Statistics are important because as Voice 2 said, “showing how much it (the disease) could affect a group of people, like how many it could affect. That’s..... what scares me”. However when it comes to numbers, visualization is key. Voice 3 said, “the one in blah blah number, like not everyone knows what that means” and “the majority of us...our eyes...it’s different seeing it than hearing it or than seeing just the plain numbers.” The group suggested for statistics to have “X’s dying or going away” or to count off people, as Voice 2 elaborated, “I will like look around the room and be like 1, 2, 3...- one of us has it and I’ll be like oh sh**, one of us is...will get affected by that if it’s one out of four. So when I see that - that’s kind of like what really captures my attention. When I can compare it to me, when I can do it myself, when I can sit there. It’s harder to be like well 62.5 percent of people will get it and you like look around and you’re like oh...you’re just like sitting there...like you can’t really visualize it...but if you are sitting there and you’re speaking to a class and you’re like

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well 1 out of 7 is gonna die from this it's just like....you look around, you count off seven people, you're like 'Wow, one of those is gone'. This is very helpful to know how someone naturally goes through understanding statistics so it could be mimicked in a video. Whether these statistics should be positively or negatively framed seems to be a difference of opinion - as Voice 1 preferred to hear that 7 out of 10 people were helped for example, while Voice 2 thought the negative held his attention more.

The importance of the internet was apparent in this focus group, such as when asked "when you hear a negative rumor or negative information about a vaccine," Voice 3 responded calling themselves an information seeker, "obviously back in 1996/1997 no one used the internet really to look up stuff. But in today's age, we have unlimited resources to studies and such and I find that my doctor tells me I need a vaccination, I always tell him if I decide to get it, I will schedule an appointment for another time because I like to go home and do my research first on it". This means that an internet video could be helpful. Whereas Voice 1 said they ask their parents.

Overall the focus group was very helpful in forming what to do for a video about vaccines as far as content and format. Even though there were only three participants, focus groups have the advantage of being able to ask follow-up questions whereas the survey could not do that. The focus group was able to clarify some information uncovered by the survey, such as the issue of "are shots vaccines?" questions, and was able to answer some follow-up questions that weren't thought of until after the survey was released, such as fear of needles.

Participants provided specific ideas for how to visualize statistics effectively and the focus of the video content was narrowed, as it was learned that discussing the details of the diseases themselves was not necessary. Both video formats were well received, so either one or a combination of the both could be used. Ultimately the focus group was of great help. When put together with the findings from the survey, the formative research provides a lot of guidance as to the video creation.

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CREATIVE PROCESS

The creative process for this project was to incorporate the research from the literature, the formative research from the survey and the knowledge from the focus group in order to write a storyboard for a video. The approach taken was to find out what doesn't have to go in the video in order to reveal what really would be helpful for millennial viewers. This approach can best be described by Michealangelo's quote *Every block of stone has a statue inside it and it is the task of the sculptor to discover it.*

The initial thought was to create a persuasive video script, as this topic is very controversial. The initial outline for a persuasive pro-vaccine video script was to compare risks....

What is a vaccine and how does it work?

What could go wrong if I DO take the vaccine?

- Addressing autism rumor

- Addressing fear of needles

What could go wrong if I DON'T take the vaccine?

Comparing which risk is bigger

Addressing Communal Risk

However, a persuasive video led to many issues. The first was as a communication major, I have studied health communication and mass communication, but there are entire classes that focus on risk communication and persuasive communication as whole classes with their own theories.

Not only do the realms of risk and persuasion come with their own ideologies, the terminology of medical risks have their own definitions. For example, a side effect and an adverse reaction are two different things. According to the World Health Organization (2005), a side effect is an "unintended effect occurring at normal dose related to pharmacological properties", whereas an adverse reaction is, "A response to a drug which is noxious and unintended, and which occurs at doses normally used in man for the prophylaxis, diagnosis, or therapy of disease, or for the modifications of physiological function'. Each type of vaccine

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has its own list of side effects on a Vaccine Information Statement (VIS), whereas adverse reactions are self-reported to the VAERS, The Vaccine Adverse Event Reporting System (The College of Physicians of Philadelphia, 2016). This system is designed so, “Anyone, such as a parent, a health care provider, or friend of the patient, who suspects an association between a vaccination and an adverse event may report that event and information about it to VAERS. The CDC then investigates the event and tries to find out whether the adverse event was in fact caused by the vaccination” (The College of Physicians of Philadelphia, 2016). The CDC is very busy, as there are about 30,000 events reported each year! (The College of Physicians of Philadelphia, 2016). This numerous and ever-changing set of adverse reactions as well as the fact that they may not be side effects (connected to the actual vaccine) at all made trying to measure and compare risks simplistically in a video seem very complicated and technical.

The decision to not make this a persuasion storyboard also had to do with the types of risks that would have been described, such as the autism myth and the fear of needles. Regarding fear of needles, one of quotes from the focus group said, “If it really came down to it I’m sure he (friend afraid of needles) would get the shot (referring to a vaccine) if he really needed to, but there’s other people that just won’t do it; It’s hard” (see Appendix B). Even though fear of needles may have been an interesting question from the Honors Council to ponder, the fear of needles just is not that persuadable of a topic. It is also not a huge factor in the decision to not get a vaccine, as it did not appear on the top reasons for Millennials to not get their flu shot from the Caffrey 2016 paper.

Not only was fear of needles in the original script outline, but discussing the autism risk (lack of) was on the list of topics. Many discussions were had between the professors and I about if this should be addressed and if so to what extent would have to be decided. As seen in the focus group, addressing the myth that autism is caused by vaccines could take up an entire video! How could such a controversial topic be briefly mentioned? As this was pondered, a second glance at the survey showed that the Millennial Bryant/Nichols college target for the videos DISAGREED that vaccines cause severe side effects such as autism ($M = 2.13$, $SD =$

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1.03). This conclusion could be made that it was not necessary to add to the script about the autism myth discussed earlier in this paper.

Overall, learning from the literature that the majority of Americans think vaccines are safe (Anderson, 2014) and learning from the survey of this particular audience they participants agreed that vaccines are safe ($M=3.63$, $SD=.95$), it was concluded that a persuasive video was not the most useful approach for a video storyboard.

STORYBOARDS EXPLANATION

Even though the video would not be persuasive, I decided to create a knowledge video that taught Millennials how vaccines work. A teaching video made sense, as most health campaigns begin with sharing messages regarding knowledge of the health issue. It was also seen in the survey that the target audience wants to know more about vaccines than they currently do ($M=3.56$ $SD=.89$) (Volkman, Hokeness, Viens, & Dickie, 2017). However it was ultimately this statement from the survey which the storyboard for the video addresses, “I believe I can get the disease I am vaccinating against from the vaccine itself” ($M=2.77$, $SD=1.13$). With a mean so close to the center neutral zone (a 3 rating on a 5 point likert scale), it can be shown that the survey respondents were of both ways when answering this question. This is also demonstrated by the standard deviation that is larger than the standard deviation of the other questions. Taking this area into account, this spreads the responses into the agree AND the disagree sides. It was not only the survey that showed there needs to be more education on how vaccines work. In the literature for Caffrey’s 2016 paper, under the reasons Millennials aren’t getting their flu shots, it was said that 29% of participants said they thought it would make them sick - which is the second highest reason of that particular study. The focus group even supported this knowledge-based video script. When asked about prior education about vaccines in school, the focus group said their prior teachings were very minimal. One of the quotes demonstrated this: “Just get your flu shot every year” (see Appendix B). I also felt comfortable doing a more science-based video than the persuasive/more marketing-related idea - as Biology is where my background lies.

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However I felt it was not responsible to base the storyboard writing solely on my memory of last year's class. I looked to the sources from Kang & Compans (2009), and the CDC (2016) to review the science. See Appendix C for the full storyboards. I specifically wrote about the self vs non-self function of the immune system. I also indirectly talked about antigens and antibodies in the storyboard. What the types of vaccines are, live attenuated and inactivated, were discussed as well as how they are created. This information was all very useful for creating the storyboards. All of the animations were created in Microsoft word except for the image of the children (see Appendix C).

After reading about repeated culturing, I knew I wanted to use an analogy for this process that could perhaps seem confusing to those not studying science. I had learned at the Alan Alda Center for Communicating Science: Improvisation Workshop that complex terminology needs to be explained using what the audience already understands. The sample exercise was trying to explain how a cell phone works to someone in the 1800s in a way that didn't sound like 'witchcraft' (using too many current terms and sayings). At the end of the exercise, the partner had to decide whether they believed the explanation or whether it was 'witchcraft' (too specialized). With this experience in my mind, I tried to think of something that repeated but got weaker, just like repeated culturing, yet something everyone experienced. I thought of the game of telephone because most people have experienced that as a child and it is a progressive weakening. However I made sure to add the actual science term along with the analogy because as Krieger and his research team (2011), which studied metaphors and cancer trials, explains that the goal should be to increase science literacy so metaphors aren't as necessary.

FUTURE WORK

The future work for this project resides with audience evolution. Even though Millennials aren't necessarily parents yet, they are old enough to go to the doctor by themselves/make their own medical decisions, which is partly why they were targeted for this project. However, next is Generation Z which is current high schoolers and below. This new generation has its own sets of attitudes and beliefs about vaccines that may not necessarily agree with the

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Millennials. Future studies should start surveying some of the older generation Z's to get a head start on current (or lack thereof) vaccine knowledge. It would be interesting over time to compare these results with Generation Z's when they become college-aged.

The future work of the storyboard itself would be to animate it so that it could be published and shared on the computer for anyone to access. However, animation from a professional company can take thousands of dollars. Another option is to invest in animation classes or to set aside many hours to learn from YouTube tutorials the necessary programs and skills for basic animation. After this video/storyboard is experienced, the next step in a health campaign process would be to get feedback and then act on it to change/alter the messaging/video to better fit the target audience.

CONCLUSION

This project took a currently existing study and tried to bring the process one step forward by applying some of the information that was found.. Vaccine hesitancy and the lack of declining vaccine coverage is still a huge health issue due to vaccine-preventable disease outbreaks and epidemics (Dube et. al., 2013). One video will not change this, so future work should continue to work on knowledge/education and legislation regarding mandatory vaccinations. A video series could be made, such as a video describing the overall immune system, discussing specific vaccines, etc. since the studies comparing videos with pamphlets showed similar knowledge intake from viewers (Krawczyk, 2012).

As far as communicating health/science through video, it was learned (from the focus group) that visualizing statistics is very important. It takes a lot of time to plan a health campaign and utilizes large amounts of research articles. However, this project demonstrated both the research and the creative aspects required to be a science communicator.

APPENDICES

Appendix A – Selected Survey Results

Survey Results: Likert Scales

“I want to know more than I currently know about vaccinations”



M= 3.56 S= .87

Survey Results: Likert Scales

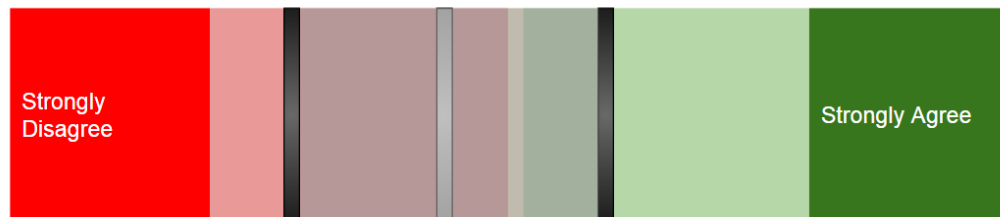
“I believe vaccines cause severe side effects such as autism”



M= 2.13 S= 1.03

Survey Results: Likert Scales

“I believe I can get the disease I am vaccinating against
from the vaccine itself”



M= 2.77 S= 1.13

Survey Results: Likert Scales

“Vaccines are safe”



M= 3.63 S= .95

Appendix B – Focus Group Transcript

12/1/2016 From recording

8:18 Are shots and vaccines the same thing? What do you guys think?

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Voice 1: I don't think they're the same thing. I know that there are certain shots that don't have to be vaccines. But I couldn't tell you the difference in what they do. I just know that they are similar things.

Voice 2: I think I guess shots are a little.... I perceive shots as more like maybe like you need a shot of morphine, like you are in a lot of pain.....it's not really preventing like anything.... Like the flu shot is the flu vaccine that prevents you from getting sick later. Whereas like a shot is just like temporary. Instant relief almost. Not instant relief but like its like an instantaneous thing....it doesn't last over months....or sometimes it does like a cortisone shot I guess....A cortisone shot is a little different than the small pox vaccine

Voice 3: Yeah I agree with that. I just think that shots are like *Voice 2* said more short term whereas vaccines aren't....it's okay, I think the issue is when you are talking to kids and they think of a shot as being the vaccine and they don't know obviously what a vaccine is...when they grow up, they don't really know what the difference is..... I know a couple of people who don't know the difference between immunization, vaccine or a shot. They didn't know what it was. They asked me like what do you get when you get the flu shot?...or MMR?

SURVEY: PEOPLE NAMED CORTISONE SHOT AND MORE TEMPORARY SHOTS WHEN ASKED TO NAME VACCINES

10:53 What questions do you have about vaccines in general? Do you believe you know enough about vaccines to make an informed decision for yourself?

Voice 1: I just I know a lot of people have VERY different opinions on vaccines and some people are very anti and some are very pro. And I've seen videos on YouTube and the internet of just cases where vaccines have apparently like gone wrong, ya know, and people have very bad reactions to them. But I think I'm just curious as to, you know, why it does that to certain people and why other people it prevents illnesses. It's just very interesting as to why people are so pro when they don't know what it can do to their body.

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Interviewer 1: So you want to know more about how vaccines actually work?

Voice 1: Yeah.

Interviewer 2: Do you want to add to that?

Voice 2: I just kind of go with what my doctor says. I trust my doctor and if she is like yeah flu shot is bad, there are...they have to match. I'll go with it. I don't need to know more about it I guess....I don't know I just trust my doctor.

Voice 2: If they are well-known doctors, and they say it, it's like well alrightI don't really question it most of the time

Interviewer 1: When you hear negative things online, who do you go to when you hear a negative rumor or negative information about a vaccine?

Voice 1: Generally, my parents, I don't really call my doctor right away....I'll ask them (*parents*) What's up with this vaccine? Why should I stay away from it? I guess I'll just go ask my family and friends.

Voice 3: I'm an information seeker, so I need to go online and do the research myself. I was actually, I am basically a byproduct of the negative effects of a vaccination, which is why your study interests me so much, your capstone.....So now knowing...obviously back in 1996/1997 no one used the internet really to look up stuff. But in today's age, we have unlimited resources to studies and such and I find that my doctor tells me I need a vaccination, I always tell him if I decide to get it, I will schedule an appointment for another time because I like to go home and do my research first on it. Just because, you know, I got that fear of what happened to me in the back of my head and I don't want that to go on to someone else or have something else wrong with me. And so when my nephew was born, my

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brother was very information seeking. He took what the doctors took into....like he asked them, but he also did his own research because he was nervous about it. And so it's funny seeing how different people, so like you trust your doctor...

Voice 2: Yeah

Voice 3: But that's....for me...I like I'm an information seeker....so like I trust them....but I DONT trust the manufacturer of the actual vaccination, so....

15:06 That's fair, that was actually one of my questions too was about vaccine regulation and safe...Do you trust that vaccines are safe and do you trust the pharmaceutical industry?

Voice 3: No

Voice 2: I mean with like vaccines, I kind of just think like, there's SO many of them out there that like what's the chances of me getting a bad batch? Or me getting reacting terrible if ALL these people have not reacted ter-...horribly to it. Kind of just, I don't know, I'm kind of just like that calming....just it's fine....what my doctor said is okay. So I've been prescribed adderall for a very long time and with that it was a little different....I started information seeking with that because like, it's not a vaccine or anything but, when they gave it to me, I reacted a lot different to like Concerta of than I did to my Focalin....like I had mood swings and I was like angry, and I wouldn't eat, I lost a bunch of weight and stuff. So with some medicine I'm definitely skeptical about. But vaccines that they say oh you need this for cold season or flu season or.... it's just kind of like oh my god, that's, everyone's doing it....it's a little different than medication. I just feel like it's OK because everyone else is doing it.

Voice 1: Yeah I think prescription medication for me, like I said before, people are so different that your body might react to something really different from another person. And that's why it kind of scares me because it's not necessarily MORE dangerous...but I don't

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know.... I see commercials, we watched one in class where it was like listing all these things that could POSSIBLY like happen to you and it's just like.....do I really want to go through that and potentially go into depression or suicidal thoughts? All that stuff. And then I think about the other side, well I am feeling kind of crappy at night, and I can't get a good night's sleep, and so it's hard to make a decision like that. And that's why you have, like, your doctors, physicians, parents, and stuff like that to help you through those decisions.

Interviewer 1: So when you say about side effects of medicines that you think about, like do you think you know information about the other side of it, like if you DIDN'T get the vaccine, like what are the repercussions of the actual like illness itself or is it only like one side that you think about?

Voice 1: Yeah, ya know, That's definitely a good point because, ya know, more you think about what it could do to me, but you could also be thinking about like the actual illness, you forget about that. That's a good point because either people are so quick to get the vaccine and don't think about what it could do to you, or so quick not to get the vaccine and don't think about, ya know, what the illness would be.

Interviewer 1: It's very one side or the other

Voice 1: Right

Interviewer 1: so it's an interesting topic to talk about. There is some research that says the illnesses are out of the population that people don't even remember what the illnesses are. Like Polio has been more recent, but things that haven't been as recent, some people do use polio as an example, like it's almost TOO good since it's gone out of the population

Voice 2: What is polio?

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Interviewer 2: I think it is a virus....

Voice 1: I could be wrong but is the movie Forrest Gump Polio? Or is that a different disease? I don't know because I know it was something along those lines, I just don't know.....

Interviewer 2: I don't know if it was polio.....

Voice 2: I thought it was Oshgood _____, I don't know, maybe it was polio, I don't know.

Voice 1: But those things are similar right?

Investigator 2: Yeah I think so but I don't remember the beginning of the movie, I don't know if he was sick or born with it....

Voice 1: But it goes back to your point..... Call me crazy but there have been studies that recently, there's been cases of Plague cases in the US. There were like 4 or 5 cases of people just having like plague symptoms and it's just crazy how people think 'oh that's gone forever, ya know, it'll never come back', and then, ya know, they don't get the vaccine and then they can get it. And your saying how it's just like not in the population anymore....it's interesting to think about....

Investigator 1: Everyone brought up about this information seeking idea. What type of information is it that your seeking? How do you know what sources to go to? What is your process when you information seek?

Voice 3: Well when _____ online, if I'm using just Google.... I try to go to a .gov or a .edu website, or like a reputable association. So like, American Cancer association, if there is some vaccine that could possibly cure cancer one day, they will probably have some information about the vaccination on there. And that's going to a reputable site. But being a college

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student and being able to access Bryant's databases, I definitely go there a lot as well to see journals and I had that ability in high school too, that my high school offered. So people will actually ask me to send them the stuff because they know I'm interested in this. So they actually ask me to send them articles about what I've found or if I could look something up for them. But I think if the average American looked them up, you'd have to use Google or some search engine and just have a general knowledge of what not to really use; so like the .com sites aren't really....the best. But making sure you don't just read one article, going through many, and trying to find testimonials from patients as well. Not just all good, not just all bad.

Interviewer 1: Do you guys (voice 1 and 2) ever information seek about vaccines? I know you (voice 2) said you trust your doctor...

Voice 2: Yeah I never....

Interviewer 1: And that's totally fine too.

Voice 1: Yeah, no, I mean, I just kind of trust my doctor like Voice 2 said, but when I do it's hard because I don't know what to find credible. So it's just difficult to be online and be like oh this website says one thing, but this other website says completely different, so, I mean it's tough to do it on your own, but sometimes it helps, and uh, if it's like a quick fact that you didn't know or something like that, it could be helpful

23:47 Interviewer 1: Do you think if like a possible direction for my project would be like the credibility of different sources and like to try to teach either Bryant students or the general public about credibility of sources. Do you think that would be effective or helpful. Especially for someone like you (voice 1) who is kind of in the middle.....What do you think would be helpful with that problem?

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Voice 1: Um yeah no I think it would be very helpful if students and the general public knew what was credible and what isn't credible because a lot of times I just go online and be like freaking out. They'll go to WebMD and see like oh my god I have this and this and they have no idea if it's really true. But with articles and journals they have a better chance of understanding what it is so that they can actually figure out if they have it or not, so I think it would be helpful.

24:43 How is it when your (voice 3) friends are presented with journals?

Voice 3: They look through it and we obviously always talk to our doctors again once we have the information. But they, myself included, always have an issue with the blah blah blah....it's literally like "and the blah blah blah blah and the blah blah blah blah" like it's all medical terms, so then you usually have to go try to find what those words mean. And even like the websites like the .gov and .edu like john hopkins...they have it slightly tailored towards the general public, but they are still using words that not everyone fully....not comprehends but....like be like Dr. Volkman said 5th grade level for reading. I find that it's almost like more on those websites more geared towards um high school or like middle school, eighth grade to high school. Or like on the databases, the medical journals, its more like you need an MD next to your name to understand it. But making sure you go and do the research...but its like extra work, which is difficult.

Interviewer 1: So is it that you don't trust that your doctor like has done that research or like...it's interesting to me...not good or bad.... just that you do research and then your doctor is still involved....you do research and then you go to your doctor afterwards....is that how it works?

Voice 3: I'll just share this, so when I was 13 months old, I got the MMR vaccination and I was diagnosed with type one diabetes a week after. And so that shot was actually linked to my diabetes, and so that's why I'm so....like I make sure I look up the information before I take anything or have a vaccination. And so I DON'T want to just say like, 'I don't trust my

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doctor, I'm not going to ever have a vaccination again', but by going out and having this, like doing my own research so that way I can better talk to my doctor. So if I go in for my annual and he's like you need the hepatitis b, i don't know what they are called, the one that protects you from a cancer, the HPV shot or vaccination and... I want to go home and do my research on it first. And then I want to be able to call him because I actually....he knows I like to do my research so he always knows to expect a call. So then I can have an educated conversation with him about why I don't want to get it or why I do want to. And then if I don't want to he says, well this and that, and so I know I did my research, but he usually is comfortable with my decision because he knows that I do my research. And I show valid points to him about why.

Interviewer 1: That's an interesting dynamic to have with your doctor. I don't know if everyone is able to have that with their doctor but that's interesting.

28:10Interviewer 1: What barriers would there be from preventing you from getting a vaccine. Because one of the things that the honors council actually brought up this idea of fear of needles. Is that an issue for you? I see you shaking your head yes....

Voice 1: Actually no, I mean I don't have an issue with it but I know a lot of people who do and that's their sole reason for not getting the vaccination and I just think that you know it's a barrier of course, but if there was some other way that they could just get the vaccination in you, it'd be very successful. There's just a lot of people I think that on that sole reason.

Interviewer 1: Yeah I know for certain vaccines, I think they have the nose spray ones and I don't know if those are pushed more towards kids instead of adults or I don't know exactly what's going on with that but with fear of needles....I don't know is there anything you could say to someone that would like change their mind or...like you said you have friends who have fear of needles...do you think that no matter what you say they are always going to have that or do you think there is something that would possibly change that?

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Voice 1: Yeah it's hard because you want to help them and but their fear...all depends on how much they fear it...if they're like 'oh I hate needles' or if they have a phobia for it or not, so it's hard. But I have a friend that really just hates it and just like, he will get a shot if he needs to, so I'm always like, I kind of tool around with him, because there are always blood drives here and'oh you gonna go get some blood taken' and he's like 'nah, never'...but if it really came down to it I'm sure he would get the shot if he really needed to, but there's other people that just won't do it. It's hard.

29:57 Interviewer 1: Going back to the research thing, in high school, maybe middle school, but mostly high school....were you guys ever taught anything about vaccines or research or anything like that....

Voice 2: Never - just get your flu shot every year.

Voice 1: Yeah

Voice 3: Same

Voice 1: Not a lot of education for that.

30:20 Interviewer 1: Not that you guys are a little bit older, is there anything that you wish was taught to you then?

All: *shake head no*

30:40 Is there anything high school could have taught you to be a better information seeker?

Voice 3: Not really, no.

30:59: Interviewer 1: Who do you think is in charge of vaccine regulation and safety?

Voice 2: FDA

Voice 1: FDA

31:00 Interviewer 1: Yeah I assume they would be pretty involved in it, I think that's it. Do you think new vaccines are safer....like safety level of new vaccines versus older vaccines....Are new vaccines as safe as older ones? And like why?

Voice 2: I mean with technology nowadays, like, I feel like that's the overall like, image they get is that everything is safer because they have all these new things that can test for everything, or like whatever....But I think like there's no real way of seeing if it's actually safer because everybody's body is different. There is no like same person in this world so it could react...like with the reaction thing....nothing's ever 100% I feel like in this world and that's not going to change with vaccines just 'cause they have the newest and latest computer...just screening.

Shows Video 1: Penn and Teller Vaccines (autism vaccine screen)

34:15 Interviewer 1: What are your thoughts on that.....?

Voice 1: It was definitely entertaining. They tried to get their point across - which I think they did. It was informational, because I never knew any of that - but, ya know, when people do that - they draw it out and do all these kinds of skits, it helps the viewer picture it in their head and be like 'Oh, maybe I'm doing the wrong thing' or 'maybe I'm doing the right thing'. So I thought it was clear.

Voice 2: He is very clear

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Voice 1: Yeah

Voice 3: Yeah, very clear

Interviewer 2: Did the numbers and the facts of that...was that overwhelming?

Voice 1: A little bit

Voice 2: Yeah, I wasn't really paying attention to it, to be honest with you

Interviewer 2: Okay

Voice 2: Yeah, I was just kind of watching him throw the balls....

Interviewer 2: Okay

Voice 1/2: I found it a little hard to keep up.

Voice 2: I understood what he was getting at though, with the throwing the ball against the plexiglass, and those weren't affecting/infecting the patients. He was throwing the balls and all the pins were getting knocked over. But I got it from that - I just didn't listen to the numbers they were saying.

Interviewer 2: Okay - but if they said the viruses - like polio, rubella, rotovirus, would that be okay vs 2000 people in 1960....

Voice 2: Yeah that stuff is kind of irrelevant I feel like. If they did that....like I think the best part about that was like when he is throwing the balls - you look behind him and half his pins fell over..... so obviously he's talking about children or whatever he was comparing it too. I

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liked that part - that visual is good I feel like. NOT like him saying like 50,000 people. But if you show it on a screen half of the x's dying or going away - that's a lot of people.

Interviewer 1: This was a visual display of science - are they more effective versus the numbers? We were talking before about the different things - like polio - what exactly is that - did you know what all those things were like diptheria, rubella...

Voice 2: Not really.

Voice 1: No i've heard of it. Most of them. I don't really know what they all do.

36:53 Interviewer 1: Would that make a difference to explain those diseases MORE than in that scene/video? Or no, is it more effective to just stay with like....

Voice 1: I think it might be more effective..personally, I think that like what they just did, me personally, I didn't know most of those, so I thought it was more effective because it was like the unknowing of like...what are those diseases? I don't even know what they are? I don't even know like what they could do to me. So it was kind of more effective for me to think that like 'Oh the vaccine blocked all those, thank god. I wonder they would do to me', ya know?.

Interviewer 1: So like the mystery of it....

Voice 1: Right, exactly.

37:28 So after seeing something like that, would you be more prone to do more research about those? Or is that like enough for you to just be like "oh, okay".

Voice 2: For me it's enough.

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37:42 Have your thoughts about vaccines changed after watching this video? Or...?

Voice 3: Mine haven't

Interviewer 1: Yours haven't? That's fair.

Voice 3: No

Interviewer 1: That's fair.

Voice 2: I don't think so, mine haven't no.

Interviewer 1: Ok

Voice 1: Not greatly, but yeah, a little bit.

Interviewer 1: That's fair

Interviewer 2: So it would be entertaining..., but not really attitude...

Voice 2: Yeah, it wouldn't be life-changing

Interviewer 1: Okay, that's good to know.

38.13 Interviewer 1: Did you know who the people in the video were? Did that make a difference?

Voice 1: I have seen them on tv and stuff, yeah.

Voice 2: Your talking about the people that were doing the commercial right there?

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Interviewer 1: Yeah

Voice 2: Like, does that matter....is that what you're asking....I mean I know if I saw some celebrity like Kim Khardashian on the screen, I'd be like, what's going on? Definetly.

But those guys did well because they were like energetic and he was swearing...so I was like...who's this guy?

Interviewer 1: Yeah that was one of my points too, was the language, the swearing, even though they were bleeped out. How did that change your feelings about the video? Do you see it as more credible? Less credible?

Voice 1: Right.

Voice 3: Less credible

Voice 2: Less credible

Voice 1: Less credible, but it expressed emphasis on the topic itself, so I guess it was....

Voice 2: Definetly less credible.

Voice 1: Yeah

Voice 2: It's unprofessional it kind of seems. It's professionally made - you can tell but it's just like this is just a guy - it's not a doctor - a doctor wouldn't be up there like f this, this is just some stupid f-ing thing.

Voice 1: But it could pose as like opinion too - that's like his opinion, so it's kind of hard for the viewer to be like....

Interviewer 2: What's interesting is that it brought up the autism study. So were you familiar with the autism...the idea that had been published that vaccines lead to autism, but then the study had gotten got debunked. Ya know, and stuff. So that's what was interesting to me when I first was watching it. I was like, that's Penn and Teller, but why are they talking about vaccines? And the cursing and stuff...well that's just how they talk....

Voice 1: Right

Interviewer 2: But I was like why are you talking about this? If....What's another comedian person..like Kevin Hart...MAYBE he would because i know he has kids.... Devin Learhy could sometimes get a little rough. But it was just weird for me to think of like a COMEDIAN talking about it. But the visual of the gaming, the kind of throwing, that made sense for me for them, visually.

Interviewer 1: Yeah, the reason why I picked the video was the visual part of it, like, trying to display science in a visual way. Whether it's pro or anti or whichever side - just to definetly....

Voice 2: Yeah the visual helps.

Interviewer 1: The visual helps - That's good to confirm.

41:04 Interviewer 1: I have this other example. This video is actually NOT about vaccines, but I this was one of the ideas I was playing with was like doing this sort of format....I don't know if you guys have ever seen ASAP Science....

Shows Video 2: ASAP Science Diet & Exercise

43:23 Interviewer 1: So what did you guys think of that one?.....If we were gonna take that format and make it about vaccines.....

Voice 1: I think....

Voice 2: It's catchy.

Voice 1: Yeah

Voice 2: It's like new kind of too I feel like and it just kind of catches your eye. You follow it alot more than if you just saw somebody talking

Interviewer 1: How is it compared to like the visual display of like the last video vs like the drawings of this video? Like should there be a combination of both or is one better than the other?

Voice 1: I wouldn't say they are better than each other....but they are definitely different. They both have their benefits. I think this one was, more geared towards the visual learner. If I were to look at it and just kind of put it in my own head. Whereas the other one, was like they're doing it, oh alright okay, makes sense because they are like playing it out.

Voice 2: What I really liked in the last one was how they knocked down the pins and show how severe some of those diseases could be. If you were to use that format, pretty much using that same idea I think would help. Like having it drawing the X's - a hundred X's but then if you don't get vaccinated, erase 50 X's. That would be cool, showing how severe NOT getting a vaccine or how severe GETTING a vaccine could be.

Interviewer 1: So it's the severity part that's really important. It's not necessarily like what diptheria is or these different things....

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Voice 2: Yeah, it's kind of just like showing how much it could affect a group of people, like how many it could affect. That's.... what scares me like...well you show me like 10 people and be like, alright well if you don't get this shot, like the ten people who didn't get the shot, okay 5 of these people are now gone. I'd be like, oh, okay, I'll get the shot. If it's a 50% chance of me dying because I don't get it or whatever - the risk - just that number, I guess the numbers gave ideas.... my perspective.

Interviewer 1: It's interesting so it's like seeing the numbers instead of saying the numbers

Voice 2: Yeah, absolutely, for me just kind of seeing it is believing it.

Voice 1: So yeah just that approach in general, not feeling that threat. We talked about it in class, the more people feel a little threatened by something, the more they might be persuaded to do it - like take a vaccine or something. So I think it would be helpful for you to kind of like draw it out and show them the risks and how it could be like dangerous to not do this or whatever...so yeah I think it'd be helpful.

Interviewer 1: So is it more like the numbers in general or is it more like a personal story like you were saying your story (voice 3), thank you for sharing part of that. Like if it were a storytelling video versus one like these or like we've been talking about. Which one would you pick or like a combination of both or....

Voice 1: It'd be interesting to see a combination of both....like yeah you could have like someone with a personal story and then backing it up with the facts and numbers...like it's not just me. It could happen to a lot of people. It could happen to 5%, whatever, I mean backing it up with numbers make the story credible.

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Voice 3: I see what your saying, numbers, but maybe numbers like we were talking about, visually...like we talked about in class, the one in blah blah blah number, like not everyone knows what that means

Voice 1: Right

Voice 3: So being able to show like a visual representation as well, I think is very important. So like the majority of us...our eyes...it's different seeing it than hearing it or than seeing just the plain numbers.

Interviewer 1: As far as like what type of number we want we want to see...I think we hit upon severity...but as far as like, you say you do a lot of research (voice 3), what numbers and things pop out to you?

Voice 3: So I kind of look for the percents for getting, ya know, something based off of x, y, z, or I also like to look at the negative side effects of the vaccination. Look into studies of what...the number of children, let's say, for instance because that's usually who gets vaccinated ... Like how many children had that vaccination and then ended up with an issue. Was it linked? Obviously it was most likely being linked to things in the survey or study... and just knowing the numbers and the percentages of how many people were affected...so that's what I always look for. If it says 50% didn't get it, then 50% did. Then I'm a little bit more leary. But then if they are like 99% of people, ya know, didn't get the issue from the vaccination then I'm like 'okay', this is probably something I can trust.

Voice 1: I agree with that. I guess what I look at is I look for the risk involved. Personally do I think it's going to affect me? And yah know, the numbers of how many people has it affected negatively, how many people has it affected positively. I usually look for that stuff and how much like....

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Voice 2: Just the probability, the probability is huge for me. So if they say like one out of 4, when anybody is talking....like I'm listening to someone speak about it, I will like look around the room and be like 1, 2, 3...- one of us has it and I'll be like oh sh**, one of us is...will get affected by that if it's one out of four. So when I see that - that's kind of like what really captures my attention. When I can compare it to me, when I can do it myself, when I can sit there. It's harder to be like well 62.5 percent of people will get it and you like look around and your like oh...your just like sitting there...like you can't really visualize it...but if you are sitting there and your speaking to a class and your like well 1 out of 7 is gonna die from this it's just like....you look around, you count off seven people, your like 'Wow, one of those is gone'. So that's kind of just how I would do it

50:02 Interviewer 1 : You brought up the point about whether it is negatively or positively framed, I don't know if you guys talked about negative and positive frame in intro health comm, but in my health campaigns class, we definitely talked about like when you say health messages - exactly what you said like if it's 50% - do you say 50% like in the negative way or 50% in the positive way - like which one do you guys....or does it not matter?

Voice 2 : I think the negative effects is what really jumps out.

Interviewer 1: So like saying...

Voice 2: When you are sitting there saying positive effects of it, I don't think that like really, I'm just like alright. I feel like people react more to being scared than they do to being comfortable. If somebody's nervous than they're going to pay attention more to it than if you're like oh you get this shot and it's gonna be sunny days for the rest of your life, ya know. They're like...they just kind of brush it off.

Voice 3: Yeah, no, I agree. The more negative of like maybe.....

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Voice 2: How like even in commercials nowadays, when they like at the end of it just whip through the negative side effects that could happen - heart disease, cancer, and you could die. Thanks for sponsoring.... It's just like really fast at the end....I feel like THAT catches my ear more than the commercial. I'll be like watching it and I'll be like "WHAT did they just say? Why? Are you kidding me?" Like rewind that, like I'd pay attention more to that than I would of the dog playing in the field that's happy with it's owner or whatever.

Interviewer 1: Right.

Voice 1: Definitely with the numbers that you were just saying...I think it depends on....like if it's above 50%, and it's positive, I'd rather hear the positive because if they're like '70% of people are.....react good to this', I'd rather be that than 30% who...I'd rather be like "oh, 70%, that's 7 out of 10 people reacted good to this rather than 3 out of 10 don't.'

Voice 3: I also feel like a lot of Americans or just general tv watchers or I'd say magazines but more magazines have the wordiness in the back so you don't see all the side effects. Like when you're watching a commercial like (voice 2) said, at the very end of that, but they don't....like a lot of people don't speak up and say 'why aren't they questioning this?'. but I mean, not that this is a drug or anything, but when you think of the tampax commercial, like, women are like swimming and doing gymnastics and or like 'periods are happy days' and ya know, they don't ever say anything negative. But now people are finally lashing out saying 'why does it only have to be positive effects? Why can't you show, ya know, periods aren't that great... so why can't we do that for medications as well?

Interviewer 1: Just in general, do you have any other suggestions I guess as to what you would want to see in a video for....it's hard for like for me to pick within like....'cause I want to do like a series of mini short videos versus like a long video, because I just think that would hold people's attention more, but like as to what to put in each one....like what do you think would be the most important thing? Or is there anything else that we haven't hit upon I guess in general...any other thoughts?

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Voice 2: I definitely like the drawing board one, that's really, I think if you were thinking about going either direction, I would suggest like that the drawing board is definitely more catchy than just the someone...you doing a commercial. I feel like that would be more like....it just looks more modern to be honest with you. Commercials have been around for so long that like...that just changes it up a bit because like...it's not like...it's just like very active. I think that's like the best way to go about it if I was gonna go about it.

Voice 3: I also feel like the sketching one was more geared towards more audiences so it can apply to the generations to come....so like I know they talked about vaccinations when you're in middle school, elementary school, high school; but they are just posters that say what it is or they say 'oh, the school requires xyz vaccination for you to be enrolled'. But I think maybe having a couple of different ones that like are geared for different age groups and that would be easy with this because that's like...when we are in middle school and high school, yeah we understand more but our attention spans were on something else that like catches our attention, it's easier to see, like 'oh it's like a cool catchy video...what's it talking about?...oh vaccinations'. It's quick, it's not just on a posterboard, ya know, it's geared to more than just one audience. I like that.

Voice 1: Yeah I think one of the cons for the other way, for the commercial, like (voice 3) said, for younger viewers it would just be like 'oh I've seen those guys on tv before' could draw away from the actual message they're trying to say. It's like 'oh look it's Penn & Teller, they're throwing balls at a shield....' It's just more informational the other way and it's not like it's not entertaining either. There's an entertaining aspect of him drawing the person and whatever so...it's very beneficial both ways.

Voice 2: Yeah.

Interviewer 1: So if I were to do the drawing one, would you want to hear more about like or do you have more questions about all vaccines in general, how that first video

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talked about vaccines in general, or is it more about specific ones like flu vaccine or hpv vaccine? I know those were kind of separate in our survey... we kind of found different people asked different things about hpv vs flu vs just everything else gets grouped together

Voice 2: I think the great thing about that is like, with the drawings, like it's hard to get lost in the drawings. If you wanted to talk about, like I don't know if you're trying to ask this, but if you're asking like.... Like are you asking if we want to know more about everything or like want to know more about specific things? If it's the drawing board then you can pretty much draw what you want, like, I mean to draw everything, at least they can see it more than yeah. So instead of you just saying it quick, and maybe them not like, pretty much hearing it or understanding it they, like you're still seeing it so...with the drawing board I feel like you can go either way. You could go more defined but like if you really wanted to, you could go really broad, and it would still, I feel have the same effect because they are seeing it AND hearing it as to just hearing somebody speaking.

Voice 1: I think with the drawing board thing, I think you could do both, if you were to talk about vaccines in general, the first part and just talk about what they are and kind of some numbers behind them... then go into like a specific one to give an example about it. Talk about like specific numbers that like this many people...you know what I mean.

Interviewer 1: Yeah

Voice 1: Because I feel like the other way couldn't really do that because, ya know, it's more geared towards ONE topic - you need to like focus in on...alright we're talking about flu vaccine...and can't focus on that. I just think the other way is more beneficial. That's all.

Voice 3: Can I ask you....I heard you say you don't want to make just one long video, you want to make short videos...Do the short videos just on the generalized just on specific or

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would you do a combination of both? Like I know you're asking us, but have you explored what you want to do for that?

Interviewer 1: That's what I am trying to figure out honestly. I could just do one giant video but personally, I think that would be a lot to look at. And I don't know what you guys think about that about breaking it up shorter...but I don't know...I think in our survey it was basically...I was thinking to do one general one and then maybe a separate one for flu or hpv

Voice 2: That's exactly what I would want.

Voice 3: Yeah That's exactly what I was thinking in my brain. That's why I asked because, you know, it's good to have like a mini-series and then like generalized. I don't know how long you are doing it for, but then going into it and then showing the visual representations of it, so like the X's where the people are and then erasing them

Voice 2: Yeah, that's...yeah. I agree have a general and then have a mini series off of that.

Interviewer 1: Yeah that's what I was thinking. I was also exploring with the idea of...a lot of what our survey was saying was about the trust and the safety and the fda....like I don't really know how in depth like people want to know about that...or like have questions about that...but I was thinking of doing maybe like a mini video about that too. I don't know how you guys feel about that - would that be helpful in making decisions?

Voice 1: Yeah I think just the overall idea of doing not one big video and doing little ones is beneficial based on the fact that you can do those things. You can go in and just do like a 5 minute video of the fda, and then you can do another 5 minute video about specifically the flu virus. I was thinking about it and I was just looking at YouTube, and seeing like you could have your own page. Say like you could have at the top 'vaccines' and all the general

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information like that in one video, then all underneath is just different flus, different vaccines, all of that. I think it's interesting.

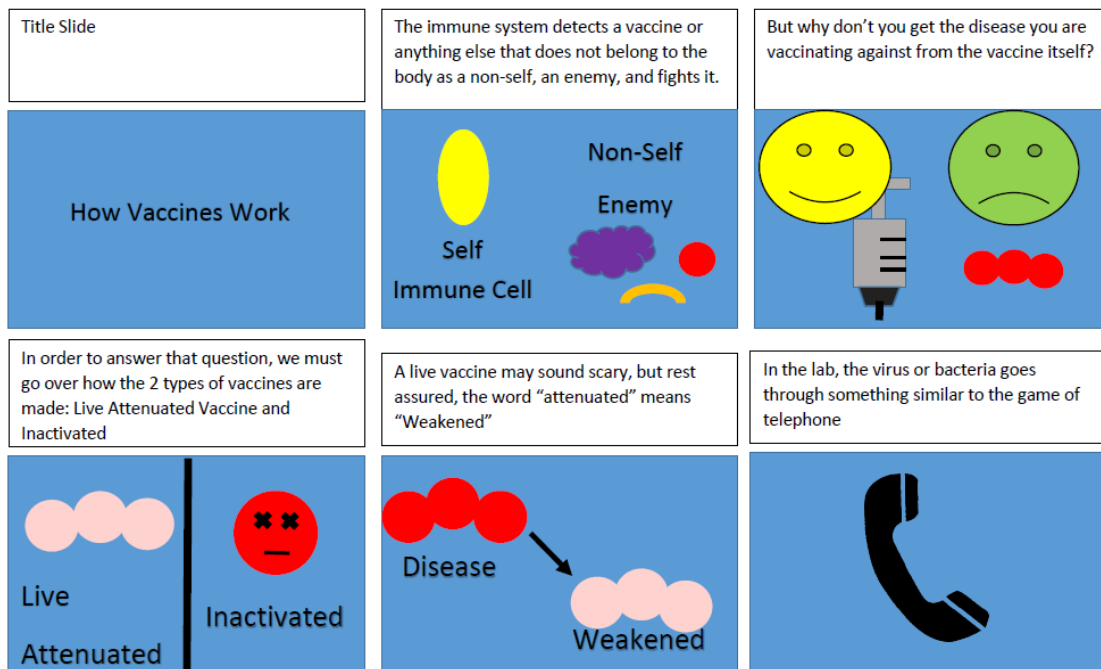
Voice 3: I think that would be a very good resource too for people, because, I don't know if you want your videos to be public or not, but like having the YouTube channel like (voice 1) just said, that way if people ARE looking for information, they have it, ya know, it'll pop up as one of the YouTube results on the search engine

Voice 2: Yeah, it would just be in one area - that's good.

Interviewer 1: Yeah, what you (voice 3) were saying about resources too, I could try to link it to whatever journals I get my articles from, so that way people could track that.

Interviewer 1: Thank you guys for participating! Was there anything else? I think we covered it. Thank you I appreciate you taking time out of your day to come.

Appendix C – Storyboards



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The game of telephone starts with one perfectly normal sentence

*"Walking in a
Winter
Wonderland"*

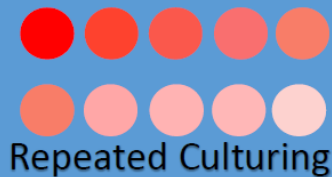
However the more times it is repeated from person to person, the sentence starts to become less and less like the original



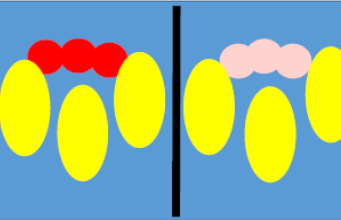
It is the same sentence, but has been weakened.

*"Winter is
wonderful when
you're walking"*

The live viruses and bacteria that go into vaccines have been through their own game of telephone - a weakening process called repeated culturing.



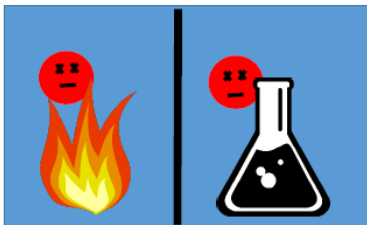
It is a weakened form of the original that can still replicate so the immune system's response is virtually identical to if you were sick, making the protection last a long time.



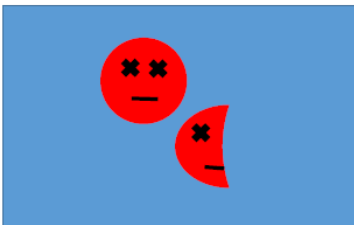
The second type of vaccine is called inactivated.

Inactivated

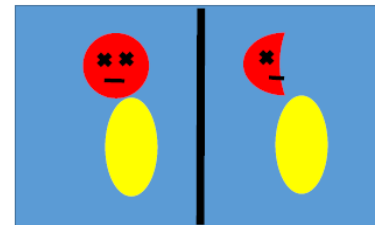
This taking the virus or bacteria and killing it with heat or chemicals



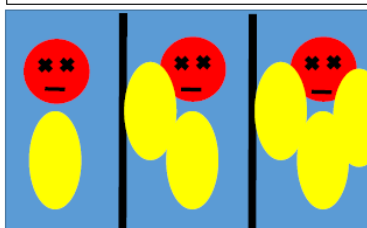
Either the whole virus or bacterium or just a piece can be used called fractional



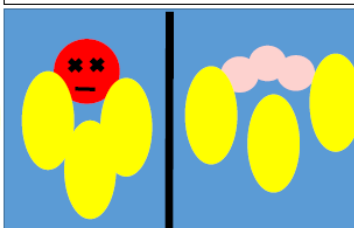
However they are dead pieces that cannot replicate. So the immune system's response is only temporary



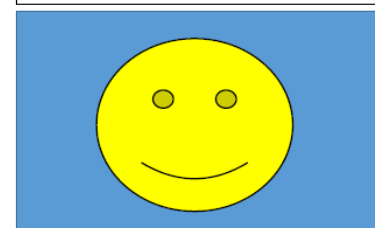
This is why you need booster shots to stay protected.



Overall, whether a vaccine is created using dead or weakened components,



the vaccine should not make you sick because your immune system can handle it.



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